

Title: Stand-up bag for flowable or pourable products.

Technical Field

The invention relates to a stand-up bag of a heat-sealable or weldable plastic film for containing in particular flowable or pourable products and comprising:

- 5 - two opposing side walls sealed together along lateral edges thereof by means of side seams;
- an inwardly folded bottom wall extending between the lower portions of the side walls and sealed to the respective side walls along transverse bottom seams and along bottom side seams; and
- 10 - an inwardly folded top wall extending between the upper portions of the side walls and connected to the respective side walls along transverse top connections and sealed to the respective side walls along top seams.

Background Art

Stand-up bags of this type are known inter alia from US-A-3,935,993 and
15 DE-A1-2553854. Due their excellent standing properties and stability the bags have been used for a wide range of products, in particular for liquid, paste-like, powdery and granular products. It is however considered a drawback of the known stand-up bags that they are difficult to open why a pair of scissors or a knife is often needed or - as for instance known from WO 93/16928 and EP-A2-0.380.110 - they are
20 provided with special discharging arrangements for easy removal of the product which makes the bag more expensive.

The above EP-A2 0380110 further discloses a stand-up bag of the type stated in the

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preamble to claim 1 of the present invention and wherein the transverse top connections between the upper edge portions of the top wall and the upper edge portions of the respective side walls are non-peelable connections. The bag is provided with a closable discharge nozzle in the upper portion of one of the side walls for discharging the contents of the bag.

Finally WO 99/10246 discloses a bag having an inwardly folded top wall and comprising a reclosable fastening member between the upper edge portion of the top wall and an upper edge portion of the adjacent side wall. In the shown and described embodiment the reclosable fastening member is formed of a plastic zipper. In addition hereto on page 5, lines 13-14 the following examples of reclosable fastening members are mentioned: a plastic zipper with a slider, an adhesive fastener, VELCRO and snaps. However none of the mentioned or shown fasteners are capable of providing a gas-tight connection or closure and thus a gas-tight bag. The provision of such fasteners is furthermore both difficult and expensive.

15 Brief Description of the Invention

The object of the invention is to provide a stand-up bag of the above type which is easy to open toollessly and which is simple and inexpensive to manufacture.

The stand-up bag according to the invention is characterised in that at least one of the transverse connections between the top wall and the side walls is a heat-sealed peelable connection provided between an upper edge portion of the top wall and an upper edge portion of the adjacent side wall. The bag is thereby easily opened by gripping the top wall and the side wall connected by means of the peelable connection and pulling the two walls apart such that the peelable connection is broken.

According to the invention the upper edge portions of the top wall and the side wall

may extend beyond the transverse peelable connection to form gripping members to be gripped when the peelable connection is to be broken. In addition to facilitating the opening of the bag, this embodiment of the invention is advantageous in that the portion of the top wall extending beyond the peelable connection may serve as a form of spout after the bag has been opened.

Furthermore according to the invention the peelable connection may comprise a film strip arranged between the upper edge portions of the top wall and the side walls, said film strip being firmly (non-peelably) heat-sealed to one of the edge portions, preferably to the edge portion of the top wall, the strip having a first surface of a sealing medium corresponding substantially to the sealing medium of the adjacent bag wall, and heat-sealed peelably to the second edge portion, preferably the edge portion of the side wall, the strip having a second surface of a sealing medium heat-sealed peelably to the sealing medium of the adjacent bag wall.

When the inner sealing medium of the bag walls is substantially made from polyethylene (PE), the first outer sealing medium layer of the film strip may be made from substantially polyethylene (PE) and the second outer sealing medium layer thereof may comprise a mixture of polyethylene (PE) and polybutylene. As a result a firm seal between the polyethylene layer of the film strip and the inner polyethylene layer of the adjacent bag wall is obtained, while a peelable seal is obtained between the second outer sealing medium layer (which is a mixture of PE and polybutylene) of the film strip and the polyethylene of the adjacent bag wall, the peel strength of the said peelable seal being easy to control.

Moreover according to the invention the peelable connection may comprise a film strip arranged between the upper edges of the top wall and the side wall and having a first and a second outer sealing medium layer with which it is firmly (non-peelably) heat-sealed to the respective edge portions and further having an intermediate layer peelably connected to at least one of the outer sealing medium layers having a tear

resistance weaker than the peel strength between the intermediate layer and the said sealing medium layer. The peelable connection is thus opened by tearing the weak sealing medium layer on both sides of the sealing seam and by a delamination between the weak sealing medium layer and the intermediate layer.

- 5 In the above embodiment of the invention the intermediate layer may advantageously be formed of a pressure-sensitive adhesive, eg a self-sealing adhesive of the hot-melt type. As described above, the intermediate layer is exposed when the peelable connection of the bag is opened. As the intermediate layer is made from a self-sealing adhesive, the layer adheres to the opposing side wall after the initial
10 opening of the bag to enable reclosure of the bag.

Furthermore according to the invention the peelable connection may comprise a peel lacquer strip of the hot-melt type which is applied to at least one of the mutually facing surfaces of the top wall and the upper edge portions of the side wall. Such a hot-melt strip is easy to apply and provides the peelable connections with a peel
15 strength which is easy to control.

Moreover according to the invention above the peelable connection the upper edge portion of the top wall may be folded down to abut the outer face of the adjacent side wall. The free edge of the folded-down edge portion is preferably positioned above the peelable connection between the top wall and the side wall. The folded-down
20 edge portion forms a flap to allow reclosure of the bag after the peelable connection has been opened.

According to the invention above the peelable connection both the upper edge portion of the top wall and the upper edge portion of the adjacent side wall may be folded down onto the adjacent side wall. The folded-down edge portions thereby form a flap
25 to allow reclosure of the bag after the peelable connection has been opened.

In the above embodiments, wherein the upper edge portion of the top wall or both the upper edge portion of the top wall and the upper edge portion of the adjacent side wall are folded down onto the outer face of the adjacent side wall, the fold may advantageously be provided in the same level as the opposite edge of the top wall and the upper edge of the opposite side wall. As a result the bag is provided with excellent stackability.

Finally according to the invention in the area of the peelable connection the upper edge portion of either the side wall or the top wall may be folded down for abutment inner face to inner face, and the wall with the folded-down edge portion may have an outer sealing medium layer heat-sealing peelably to the inner sealing medium layer of the other wall. This embodiment of the invention makes it possible to manufacture the bag from a single film web without any further steps.

In the above embodiment of the invention the outer sealing medium layer of the wall with the folded-down edge may advantageously be a copolymer comprising polyethylene and polypropylene when the inner sealing medium layer of the bag walls is made from substantially polyethylene.

The peel strength of the peelable connections may range from 100 to 800 g/20 mm, preferably from 200 to 600 g/20 mm, and most preferably from 300 to 500 g/20 mm.

20 Brief Description of the Drawings

The invention is explained in detail below with reference to the drawings, in which

Fig. 1 is an isometric view of a stand-up bag according to the invention,

Fig. 2 is a side view of a collapsed stand-up bag according to the invention,

Fig. 3 is a sectional view along the line III-III in Fig. 2, the walls of the stand-up bag for purely illustrative reasons being separated from each other and the seals therebetween thus being partially omitted or shown diagrammatically, Fig. 3 further illustrating a first embodiment of a peelable connection between a side wall and a top wall of the bag,

Fig. 4 is a partial sectional view corresponding to Fig. 3 to illustrate a second embodiment of a peelable connection,

Fig. 5 is a partial sectional view corresponding to Fig. 3 to illustrate a third embodiment of the peelable connection,

Fig. 6 is a partial sectional view corresponding to Fig. 3 to illustrate a fourth embodiment of a peelable connection,

Fig. 7 is a partial sectional view corresponding to Fig. 3 through a first modification of the embodiment shown in Fig. 5, and

Fig. 8 is a partial sectional view corresponding to Fig. 3 of a second modification of the embodiment shown in Fig. 5.

Best Mode for Carrying Out the Invention

The stand-up bag according to the invention shown in Figs. 1 to 3 comprises two opposed side walls 1,2, a top wall 3 and a bottom wall 4 arranged opposite one another. The side walls 1,2 are sealed together by means of side seams 5,6 extending along two opposed side edges. The bottom wall 4 is folded inwardly along a bottom wall fold 13 and sealed to the side walls 1,2 along two opposed transverse seals 7,8. Correspondingly the top wall 3 is folded inwardly along a top wall fold 14 and sealed to the side wall 1 along an upper transverse seal 11 and connected to the

side wall 2 by means of a transverse peelable connection 12. The transverse peelable connection 12 is arranged opposite the transverse seal 11 and is explained in detail below. Furthermore both the folded top wall 3 and the folded bottom wall 4 is sealed onto itself and to the side walls along the side seams 5,6. As illustrated the bag may further have oblique seams 9,10, each extending from the fold area of the bottom wall 4 in the respective side seam 5,6 to the adjacent transverse seams 7,8. Each of the oblique seams 9,10 connects a side wall 1,2 to the adjacent area of the bottom wall 4.

As shown in Figs 1 to 3 an upper edge portion 15 of the side wall 2 extends slightly beyond the transverse peelable connection 12. Correspondingly an upper edge portion 16 of the top wall 3 extends slightly beyond the transverse peelable connection 12 between the top wall 3 and the side wall 2, said edge portions 15,16 forming gripping members to be gripped when the peelable connection 12 is to be broken for opening of the bag.

As shown in Figs. 1 to 3 the peelable connection comprises a film strip 17 between the upper edge portions 16,15 of the top wall 3 and the side wall 2, said film strip being sealed to the edge portion of the top wall 3 by means of a strong seal and sealed to the edge portion 15 of the side wall 2 by means of a peelable seal. This feature is obtained by the strip 17 comprising a first surface 18 of a sealing medium facing the top wall 3, said sealing medium layer corresponding substantially to the sealing medium layer forming the inner surface 19 of the top wall 3 and further comprising a second surface 20 of a sealing medium layer facing the side wall 2, said sealing medium sealing peelably by heat sealing to the sealing medium layer forming the inner surface 21 of the side wall 2. When the inner surface 19 of the top wall 3 and the inner surface 21 of the side wall 2 is made from polyethylene, the first surface 18 of the strip 17 may also be made from polyethylene, while the second surface 20 thereof may be formed of a mixture of polyethylene and polybutylene. When tearing open the peelable connection 12, the strip 17 remains on the top wall

3 and does not impede the discharge of the product in the bag, the discharge taking place through the upper edge portion 15 of the side wall 2, said portion serving as a form of spout.

Even though Fig. 3 illustrates that the side walls 1,2 and the bottom and top walls 4,3 are formed of separate films sealed together, it should be understood that the bag may be formed of a single film web as suggested by means of the dotted lines 22 to 24. A plurality of different plastic laminates may be used for manufacturing the bag according to the invention. Examples hereof include:

When manufacturing the bag from a single film web it is advantageous to use a laminate having both an outer and an inner sealing medium layer such that the bottom wall is sealed onto itself along side seams 5,6 in order obtain the intended good standing ability. This may be obtained by means of the laminate coex OPP/PETP (polyester)/PE, in which the PE-layer is on the inner side seen in relation to the finished bag and coex OPP denotes a co-extruded oriented polypropylene film provided with a thin sealing medium layer on each side comprising a copolymer of PP and PE. In order to obtain enhanced barrier properties a barrier layer, eg an aluminium film, may be provided between the PETP layer and the PE layer or the coex OPP film. Furthermore the PETP layer may be replaced by an oriented polyamide (OPA).

To further increase the standing properties and stability of the bag, a stronger or more rigid film may be used for the side walls than for the bottom and top walls. The bag is then made from four sheet webs. The same laminates as mentioned above may be used, thicker laminates being used for the side walls than for the bottom and top walls. However it is also possible to use a PETP/PE laminate (or PETP/PP laminate) for the side walls, in which PE facing inwards seen in relation to the bag, and a PE/PETP/PE laminate (PP/PETP/PP laminate) or the above coex OPP/PETP/ PE laminate for the bottom and top walls. Also in the instance PETP may be replaced

by OPA and the laminates may comprise a barrier layer for instance in form of an aluminium film.

It should further be noted that the bag may be formed from a single film web and from four separate film webs on a vertical form, fill and seal machine. The same
5 applies to the manufacture of pre-fabricated bags, ie ready-made bags apart from one side seam.

Fig. 4 illustrates a second embodiment of a peelable connection 32 between the upper edge portion 15 of the side wall 2 and the upper edge portion 16 of the top wall 3. This peelable connection 32 comprises a film strip 37 arranged between the two edge
10 portions 15 and 16 and having a first surface layer 28 and a second surface layer 29 of a sealing medium corresponding to the sealing medium forming the inner surface 19 of the top wall 3 and the sealing medium layer forming the inner surface 20 of the side wall 2, said film strip thus being heat-sealed non-peelably to the said surfaces. An intermediate layer 30 is provided between the two surface layers 28 and 29 and
15 is connected peelably to the second surface layer 29 and preferably connected more firmly to the first surface layer 28. Further the tear resistance of the second surface layer 29 is weaker than the peel strength between said layer and the intermediate layer 30. When the edge portions 15, 16 are pulled to open the peelable connection 32, the layer 29 is torn off along the edges of the transverse seam 31 corresponding
20 to the edges of the sealing tool used. Furthermore a delamination takes place between the layer 29 and the intermediate layer 30 in the portion corresponding to the sealing zone. The use of an intermediate layer 30 of a pressure-sensitive adhesive allow for reclosure of the peelable connection 32 and thus of the bag after the initial opening thereof by pressing the exposed portion of the intermediate layer 30 against the
25 corresponding portion of the edge portion 15 of the side wall 2.

Fig. 5 illustrates a third embodiment of a peelable connection 42. This peelable connection comprises a hot-melt strip 47 applied to the inner surface 19 of the upper

edge portion 16 of the top wall 3. By activating the hot-melt by means of sealing tools, the peelable connection 42 of a width corresponding to the width of the sealing tools is provided between the edge portion 15 of the side wall 2 and the edge portion 16 of the top wall 3 in the transverse sealing zone 41.

- 5 Fig. 6 illustrates a fourth embodiment of a peelable connection 52 between the upper edge portion 15 of the side wall and the upper edge portion 36 of the top wall 3. The upper edge portion 36 of the top wall is folded down for abutment inner face to inner face such that the outer surface 38 of the top wall 3 faces the inner surface 20 of the side wall 3. As the outer surface 38 of the top wall 3 is formed of a sealing medium
 10 sealing peelably to the inner surface 20 of the side wall, the peelable connection 52 is provided in a transverse sealing zone 51 in a width corresponding to the width of the sealing tool used to seal the upper edge portion 36 of the top wall 3 to the upper edge portion 15 of the side wall 2. In this embodiment of the peelable connection it is advantageous to use the above coex OPP/PETP/PE laminate for the top wall 3 and
 15 the side wall 2.

In the embodiments described above a plastic zipper comprising matable, reclosable zipper elements may be arranged above the peelable connection 12, 32, 42, 52, said elements carried by the opposed surfaces of the upper edge portion of the side wall 2 and the edge portion of the top wall 3, respectively in order to provide the bag with
 20 reclosability. In a manner known per se the zipper elements may be formed integrally with the respective upper edge portion or be arranged on zipper element strips sealed to the respective upper edge portions.

Fig. 7 illustrates a first modification of the embodiment described with reference to Fig. 5. In this modification the upper end portion of the top wall 3 is provided with
 25 an extension 53 which is folded down (at reference numeral 59) onto the outer face of the upper edge portion 15 of the side wall 2. The free edge 54 of extension 53 is situated above the seam 41 providing the peelable connection 42 between the side

wall 2 and the top wall 3. The extension 53 thus forms a flap on the bag allowing for reclosability.

The flap or extension 53 is further sealed to the outer face of the side wall 2 in the area of the side seams 5,6 of the side wall. By suitably selecting the material forming the inner surface of the top wall 3 and the outer surface of the side wall, the flap is fusion-sealed to the side wall 2 in the area of the side seams 5,6, whereby optimum reclosability is obtained.

It should be noted that in the modification shown in Fig. 7 also the embodiments described with reference to Figs. 1 to 4 of the reclosable connections 12,32 may be used instead of the embodiment 42 described with reference to Fig. 5.

Moreover, it should be noted that the fold 59 also may be positioned at the same level as the opposed free edge of the top wall and the opposed side wall, as described below in connection with a further modification.

Fig. 8 illustrates a second modification of the embodiment described with reference to Fig. 5. In this modification the upper edge portion 60 of the top wall 3 and the upper edge portion 58 of the side wall 2 are jointly folded down onto the side wall at reference numeral 55. The fold 55 is substantially at the same level as the opposed edge 61 of the top wall 3 and the upper edge 56 of the opposed side wall 1. By arranging the fold 55, the opposed edge 61 of the top wall and the upper edge 56 of the opposed side wall 1 at the same level a bag with good stackability is provided. The lower free edges of the upper folded-down edge portions 58, 60 extend beyond the peelable connection 42 provided between the top wall 3 and the side wall 2 by the sealing zone 41.

It should furthermore be noted that the hot-melt strip 47' extends onto the folded-down edge portion 60 of the top wall 3. Thus, at the same time as the peelable

connection 42 is provided in the sealing zone 41, an additional peelable connection is provided between the folded-down edge portions 58, 60 in a corresponding sealing zone 57.

It should be noted that also in the modification shown in Fig. 8 the embodiments 5 described with reference to Figs. 1 to 4 of the reclosable connections 12,32 may be used instead of the embodiment 42 described with reference to Fig. 5.

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